

KANSAS COOPERATIVE PLANT DISEASE SURVEY REPORT

PRELIMINARY 2010 KANSAS WHEAT DISEASE LOSS ESTIMATES

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Jon A. Appel, Erick DeWolf, William W. Bockus, Timothy Todd and Robert L. Bowden

Plant Pathologist, Plant Protection Program, Kansas Department of Agriculture, Topeka, 66619;
Extension Specialist, Plant Pathology, Kansas State University, Manhattan 66506; Professor,
Plant Pathology, Kansas State University, 66506; Nematologist, Plant Pathology, Kansas State
University 66506, Research Plant Pathologist, USDA-ARS, Kansas State University, 66506.

http://www.ksda.gov/includes/document_center/plant_protection/Plant_Disease_Reports/2010KSWhetDiseaseLossEstimates.pdf

HIGHLIGHTS

Diseases of wheat were estimated to cause a loss of 13.6 per cent or 58.1 million bushels. The 2010 estimate was 2.2 per cent above the 20-year average.

The USDA National Agricultural Statistics Service July forecast of 369 million bushels represented an expected harvest on 8.2 million acres with a forecasted yield of 45 bushels to the acre. The 2010 yield forecast was 3 bushels greater than 2009 final yield on 600, 000 fewer acres harvested.

Stripe rust was the most important disease accounting for about $\frac{3}{4}$ of the overall disease estimate. The *Septoria* complex and leaf rust were ranked second and third respectively in importance but minor in comparison to stripe rust.

Yield Loss in 2010

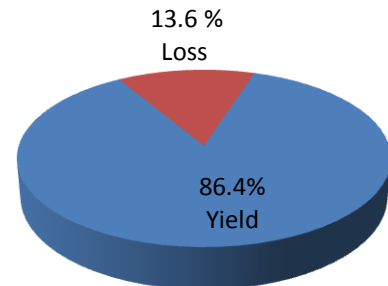


Figure 1. The yield loss in relation to a 427 million bushel potential crop

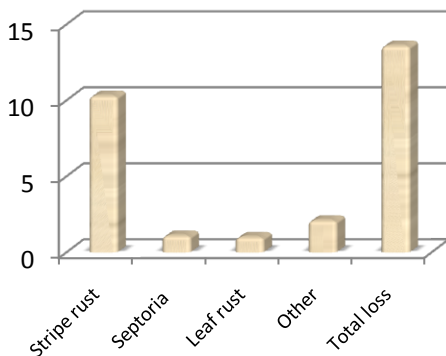


Figure 2. Comparison of disease losses

DISEASES

Stripe Rust

Stripe rust was the disease of greatest importance in 2010 with 10.3 per cent loss or 42.5 million bushels. It represented 76 per cent of the disease loss statewide and was equal to the largest stripe rust loss since 1976 when estimates began.

Cooler and moist conditions favor stripe rust. These weather conditions were predominate in Kansas during the spring growing season. Frequent frontal systems regularly pushed through the state from the north and west. The weather conditions coupled with a pathogen virulence shift to some previous resistant and intermediate varieties accounted for the epidemic in Kansas. The northwest quarter of the state had the favorable weather and a late maturing crop and it was where the disease had the greatest impact. Large acreages were sprayed in the northwest quarter of the state to reduce the rust epidemic but in spite of those efforts, losses were incurred. Farmers, consultants, and ag officials found in mid-May that wheat had taken a yellow to light orange cast and the ground after a moderate rain was sometimes colored from rust spores. Hardest hit districts were west central and northwest Kansas with losses greater than 16 per cent overall and over 30 per cent on susceptible varieties. The next grouping of districts that had significant rust were central and north central Kansas losing 10 per cent of the production. Southeast, south central, and southwest Kansas were next in significance with a range of 6-8 per cent loss.

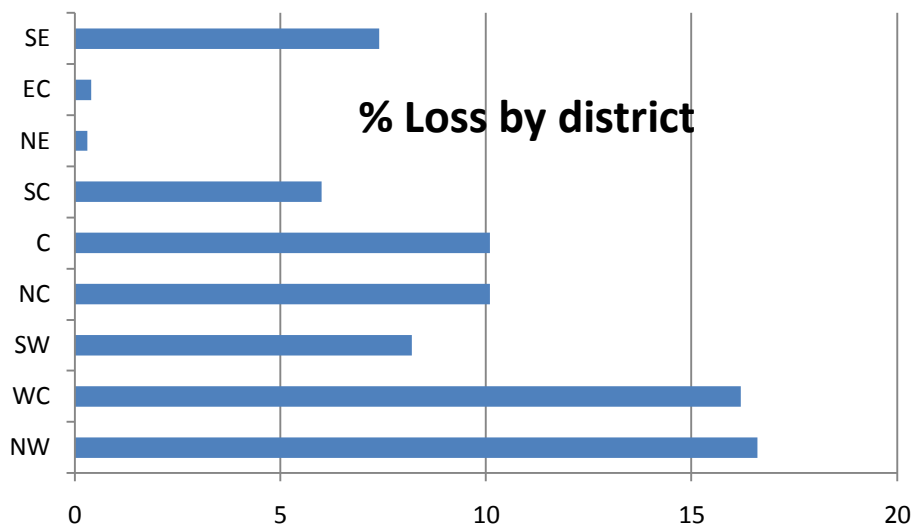


Figure 3. Stripe rust losses for crop reporting districts

The loss from stripe rust compares to the twenty- year average of 2.1 per cent and had been relatively insignificant 4 of the past five years.

***Septoria* Complex**

The *Septoria* complex, *Stagonospora nodurum* and *Septoria tritici*, accounted for a 1.1 per cent loss statewide. This disease complex favored by wet conditions prospered in many fields from

Coffeyville in southeast Kansas northward into fields near Phillipsburg in north central Kansas. Leaf severities reached over 50 per cent of the leaf area. The 2010 observations and estimated percentage were similar to 2009 estimates. 4.7 million bushels were lost to the disease.

Table 1. Yield Losses (%) from disease

	2010	2009	20 yr. avg.
Stripe rust	10.3	0.01	2.14
<i>Septoria</i> complex	1.1	1	1.14
Leaf rust	1	1.37	3.78
Barley yellow dwarf	0.3	0.4	1.07
Head scab	0.3	0.9	0.49
Wheat streak mosaic	0.2	0.001	1.12
Tan spot	0.2	0.3	0.95
Soil borne and spindle streak	0.1	0.001	0.22
Powdery mildew	0.1	0.02	0.13
Bunt and loose smut	0.03	0.04	0.02
Root and crown rot	0.01	0.001	0.07
Take all	0.001	0.01	0.17
Stem Rust	0.001	0.001	0.06
Ceph. stripe	0.001	0.001	0

Leaf Rust

Leaf rust was not as abundant in 2010 as in other years. Weather conditions favored stripe rust and competition between the two diseases accounted for some of the low levels of leaf rust. More importantly, inoculum build up in Oklahoma was modest and somewhat late. Southern areas of Kansas that often are hit hard by leaf rust avoided infection until the late dough stage. It was in this area of the state by avoiding both rusts where the wheat had some of the higher yields. In 2007 when rust exploded in Oklahoma, Kansas experienced nearly a 14 per cent reduction in yield directly associated with wind-blown inoculum. Some late leaf rust was observed in central and northern counties and was responsible for much of the 2010 estimate.

A 1 per cent estimate was made for leaf rust and it compares to a 3.8 twenty-year average. Leaf rust remains the most important disease to Kansas yields over time.

Barley Yellow Dwarf and Scab

Barley yellow dwarf and head scab disease were estimated each to have caused 0.3 of a per cent loss in fields statewide.

Observations of BYD, an aphid borne virus, were made primarily in south central Kansas in Reno, Sumner, Pratt, and Kingman counties but a few reports came in from other districts of Kansas. Head scab was a problem in the historical areas of southeast and north central Kansas where corn is often rotated with wheat. Occasional fields were found in western counties with moderate levels of scab when corn was in rotation with wheat and overhead irrigation was present.

For both diseases, 2010 was a down year. The BYD estimate compares to an average of 1 per cent and head scab was below its 0.5 per cent average and recent estimates of 0.9 and 1.9 per cent the two previous years.

Wheat Streak Mosaic and Tan Spot

The loss estimates for the wheat streak mosaic complex and tan spot was 0.2 per cent. A few significant reports of wheat streak mosaic were in the western third of the state. Reports were made of over 50 per cent infection in a couple of sites and related to carry over volunteer wheat in nearby proximity. Overall, the virus complex was down in occurrence in both fall and spring surveys. The average loss is 1.1 per cent and the most recent epidemic was in 2006 when a 7 per cent estimate was made.

Tan spot like wheat streak mosaic has not been a major factor for several years. This year, competition with stripe rust and speckled leaf blotch for leaf tissue may have been a factor. The estimate compares to an average estimate of 1 per cent.

Other Observations

Common bunt was reported to be a problem by elevators in some areas of the state. Concerns were made in the Barber and Pratt county area of the state and in the Oakley area of northwest Kansas. *Cephalosporium* stripe was reported several times in Reno County. In western Kansas where soil borne susceptible varieties are more common, the disease was reported in fields and in diagnostic samples received at Kansas State University. Other observation included stem rust and powdery mildew.

Nematodes (not included in the overall estimate)

The third and final year of a statewide wheat survey for nematodes was completed this spring. The survey covered the area eastward from Sumner County in the south to Jewell County in the north in Kansas. No exotic nematodes were found in the fields repeating the two previous years of survey in the heavy production areas of central and western Kansas.

Overall, *Pratylenchus neglectus* was the dominant species in over 90 per cent of the samples statewide. *Pratylenchus thornei* was in less than 3 per cent of the samples statewide and in eastern Kansas, *Pratylenchus alleni* was reported in a few samples. The preliminary results of the survey indicate that lesion nematode populations are significantly smaller in the three eastern crop reporting districts as compared to areas to the west where nematodes in the roots average about 2,000 individuals per gram of dry root.

The Kansas results have similarity with incidence and species of nematodes to wheat studies in the Pacific Northwest. A \$51 million loss annually was estimated from the Pacific Northwest. The survey was conducted in 23 counties in Washington, Oregon, and Idaho.

In Kansas, the nematode loss appears to be about 2 per cent statewide based on some Oklahoma yield loss studies and our preliminary study analysis. This implies about a statewide 8.5 million bushel loss for 2010 if the assumption is made of yearly consistent populations of nematodes. Plans for the LOSS ESTIMATE are to conduct a smaller survey annually for nematode root populations and incorporate those findings into an annual loss estimate like other diseases.

About the loss estimates: Estimates prepared by Kansas State University, Kansas Department of Agriculture, and USDA-ARS personnel. Estimates are based on expert opinions but are not statistically designed. Estimates utilize disease survey, variety resistance and acreages, crop reporting district yield estimates, and loss functions. Trace amounts are denoted by 0.001

Special thanks to the Great Plains Diagnostic Clinic, Kansas State University, and the staff of the Plant Protection and Weed Control Program for their help in survey and diagnosis of wheat diseases.